Addendum No. 1 to RFP No. SPTT-102403
06 November 2003

Except as specifically modified herein, this RFP remains unchanged. Proposers are reminded that receipt of this Addendum No. 1 must be acknowledged on Attachment A-1 or A-5 to the solicitation.

Proposers are reminded that the issuance of any Subcontract resulting from this solicitation is subject to the Terms and Conditions of JPL's Prime Contract with NASA.

The following questions and answers are provided as a clarification to this RFP:

Question 1:

Is it possible for JPL to supply more detail in the test vehicle properties? Specifically, Pioneer would prefer to have information on the aerodynamic and inertial properties of the vehicle for the expected test environment. Properties such as Coefficient of Drag with respect to Angle of Attack, total drag area of the vehicle, variation of drag properties with respect to Mach number, etc. would allow Pioneer to conduct parametric simulations of the test. These simulations are essential to the design optimization of the requested system.

Answer 1:

The attached Excel file, "DVaero.xls" provides the aerodynamic coefficients over a range of Mach numbers and Angle of Attacks. The moment coefficients are written for the center of gravity of the vehicle. Figure 1 at the bottom of this file gives the geometry of the vehicle, including the location of the CG. The mass moments of inertia, written about the CG are:

Drop Vehicle	**Mass (kg)**	**X (mm)**	**Y (mm)**	**Z (mm)**		
Base value	860	0	0	1070		
Uncertainty	100	50	50	100		
Inertias (kg-m^2)	**Ixx**	**Iyy**	**Izz**	**Ixy**	**Ixz**	**Iyz**
Base Value	500	420	500	1	1	1
Uncertainty	50	40	50	1	1	1

Note that these values are only an estimate at this time and are subject to change.

Question 2:

The ICD states that the dimensions listed are in inches. We believe that the drawing dimensions are in millimeters. Please clarify. Also, there is no total height given for the parachute pack. Please provide a total height or allowable height range.

Answer 2:

These dimensions are in millimeters. The maximum allowable height is 280 mm.

Addendum No. 1 to RFP No. SPTT-102403
06 November 2003

Question 3:

Is there any description or better definition of the JPL-supplied plate referenced on the ICD? Does JPL have a mass estimate of the plate? How is the ripstitch attachment interface expected to perform? This information will be used to determine the design of the mating deployment bag and to estimate the bag snatch forces.

Answer 3:

There is currently no better definition of the JPL supplied mounting plate. We expect to work out this design in conjunction with the contractor during the initial series of teleconferences. There is no current mass estimate for the plate, although we expect it to be less than 20 kg. Note that this plate gets bolted to the drop vehicle, and it is unclear to JPL why the plate mass is required at this time. Additionally, we expect the contractor to specify the ripstich attachment interface such that the requirements in the specification are met. JPL expects to have considerable design flexibility in this plate to allow the contractor to mount the parachute in their desired configuration.

Question 4:

Does JPL know if the canopy release devices will accept 44.5 mm or 25.4 mm wide web material? Is it expected that the release device interfaces with the drogue and main bridle legs will be identical?

Answer 4:

Either width material will be acceptable. JPL expects the release device interfaces to be the same between the drogue and main bridle legs, unless there is a compelling technical reason to make them different.

Question 5:

Regarding the Drogue canopy, how does JPL expect the drogue drag area requirement of 21 +/- 2 m^2 to be verified? What level of uncertainty will be allowed?

Answer 5:

JPL expects the drag area to be verified through analysis or reference to existing test data on similar designs. The allowable uncertainty is 2 m^2 (10%).

Question 6:

Regarding the Drogue canopy, is the 1.5 kg mass of the balloon vent attachment included in the maximum mass requirement of less than 12 kg for the drogue canopy?

Answer 6:

The 1.5kg is not included. There is 12kg available for the drogue canopy.

Addendum No. 1 to RFP No. SPTT-102403
06 November 2003

Question 7:

Regarding the Drogue canopy, paragraph 3.3.2.3 of the Performance Specification uses the term "trim angle" and "during descent" in the same sentence and associates the specified requirement with the canopy and drop vehicle combination. Does JPL refer to trim angle or total oscillation angle? What are the uncertainties associated with this requirement? How will this requirement be verified?

Answer 7:

The intention of this section was to specify an average angle of oscillation. A satisfactory method of verification would be the citing of published data such as that provided in tables 2.1 (page 75) and 2.2 (page 76) of the Recovery System Design Guide (Ewing, E. G., Bixby, H. W., and Knacke, T. W.: Recovery System Design Guide, AFFDL-TR-78-151, 1978.).

Examples

The Recovery System Design Guide lists the average angle of oscillation for a Flat Circular canopy to be from ±10° to ±40°. Thus, since the average angle of oscillation for this canopy can be as high as ±40°, this canopy does not meet the requirement.

The Recovery System Design Guide lists the average angle of oscillation for a Extended Skirt 10% Flat canopy to be from ±10° to ±15°. Thus, since the average angle of oscillation for this canopy does not exceed ±15°, this canopy meets the requirement.

Question 8:

Regarding the Drogue canopy, the 1.5 kg mass attached to the drogue apex will rebound when released. Is there a provision to allow an energy (ripstitch) modulator attachment to the balloon gondola release mechanism? One end of this modulator would attach to the balloon-side of the interface and the other would attach to the apex of the drogue canopy (similar to the vent leash discussed in the Ringsail Workshop at JPL on 16 September). There would be residual spent webbing tails attached to both interfaces following release. This allowance would require a hard point attachment near the release mechanism on the balloon gondola.

Answer 8:

JPL and NSBF have discussed the addition of such an energy modulator and agree that it is likely to be possible.

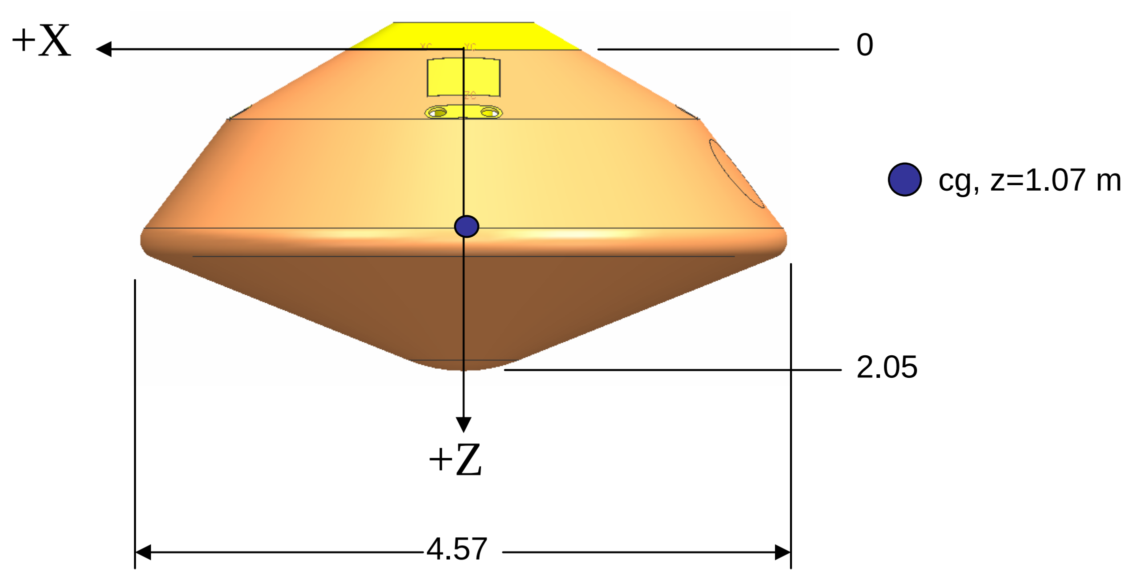
Addendum No. 1 to RFP No. SPTT-102403
06 November 2003

Question 9:

Section 3.2.1.7, Reefing Option, in the Performance Specification (Exhibit 1) states the following: "The reefing system should be able to be installed or removed at the field test site". In order to be able to meet this requirement the packed parachute would need to be partially unpacked to gain access to the reefing rings. If that is true the parachute would have to be re-packed on-site. It is assumed that the capability to re-pack this size parachute would not be available. Removal of the reefing system might be feasible, but installation would not be feasible. Please explain this requirement in more detail.

Answer 9:

The intention of this requirement is not to force the ability to pack the parachute at the field test site. JPL would like to be able to add the reefing system to a parachute within 2 weeks, and if this requires shipment back to the contractor to do so, it would be acceptable.



(Dimensions in meters)
Figure 1: Drop vehicle dimensions and CG location

MACH = .400
XCG/D = -.230
ZCG/D = -0

ALPHA	CN	CA	CSM
0	0	1.044	0
1	-0.001	1.0426	-0.0025
2	0.006	1.046	-0.0048
3	0.007	1.0474	-0.0073
4	0.0013	1.0459	-0.01
5	0.0021	1.0451	-0.0125
6	0.0032	1.0448	-0.0149
7	0.0044	1.0447	-0.0173
8	0.0058	1.0451	-0.0196
9	0.0072	1.0462	-0.0219
10	0.0087	1.0476	-0.0242
11	0.0106	1.0491	-0.0265
12	0.0127	1.0501	-0.0287
13	0.015	1.0499	-0.0308
14	0.0174	1.049	-0.0329
15	0.0198	1.0466	-0.0349
16	0.0221	1.0448	-0.0369
17	0.0243	1.0431	-0.0389
18	0.0265	1.0413	-0.0408
19	0.0289	1.0388	-0.0427
20	0.0313	1.0353	-0.0446
21	0.0339	1.0303	-0.0466
22	0.0367	1.0233	-0.0485
23	0.0398	1.0139	-0.0504
24	0.0432	1.0017	-0.0524

MACH = .600
XCG/D = -.230
ZCG/D = -0.

ALPHA	CN	CA	CSM
0	0	1.0951	0
1	0.0004	1.0989	-0.0023
2	0.0001	1.096	-0.0055
3	0.0004	1.0924	-0.0079
4	0.0013	1.094	-0.0104
5	0.0026	1.0959	-0.0128
6	0.0042	1.0973	-0.0152
7	0.0055	1.0962	-0.0177
8	0.007	1.0947	-0.0201
9	0.0089	1.0945	-0.0223
10	0.011	1.0947	-0.0245
11	0.0135	1.0949	-0.0267
12	0.0161	1.95	-0.0289
13	0.0186	1.0951	-0.031
14	0.0211	1.0943	-0.033
15	0.0237	1.0922	-0.035
16	0.0262	1.0902	-0.037
17	0.0288	1.0878	-0.039
18	0.0313	1.085	-0.041
19	0.0338	1.0815	-0.043
20	0.0363	1.0775	-0.0449
21	0.0387	1.0729	-0.0468
22	0.0411	1.0676	-0.0487
23	0.0435	1.0616	-0.0505
24	0.0458	1.0548	-0.0523

MACH = .800
XCG/D = -.23
ZCG/D =0.

ALPHA	CN	CA	CSM
0	0	1.1606	0
1	-0.0007	1.1601	-0.0031
2	0.0007	1.1616	-0.0051
3	0.0008	1.1625	-0.0078
4	0.0016	1.1624	-0.0102
5	0.0029	1.164	-0.0126
6	0.0046	1.1665	-0.0149
7	0.0084	1.1693	-0.0173
8	0.0086	1.1716	-0.0195
9	0.0112	1.1721	-0.0216
10	0.0141	1.1719	-0.0235
11	0.017	1.1717	-0.0255
12	0.0199	1.1709	-0.0275
13	0.0226	1.1695	-0.0294
14	0.0253	1.1673	-0.0314
15	0.0288	1.1644	-0.0333
16	0.0307	1.1609	-0.0351
17	0.0334	1.1568	-0.037
18	0.0361	1.1522	-0.0389
19	0.0387	1.1472	-0.0408
20	0.0413	1.1419	-0.0427
21	0.0438	1.1363	-0.0445
22	0.0461	1.1306	-0.0464
23	0.0483	1.1249	-0.0482
24	0.0503	1.1193	-0.05

MACH = .900
XCG/D = -.23
ZCG = -0.

ALPHA	CN	CA	CSM
0	0	1.2139	0
1	-0.0015	1.2152	-0.0029
2	-0.0013	1.219	-0.0055
3	-0.0004	1.2239	-0.0078
4	0.0008	1.2256	-0.0103
5	0.0022	1.2279	-0.0124
6	0.0038	1.23	-0.0144
7	0.0058	1.2307	-0.0165
8	0.0082	1.2311	-0.0187
9	0.011	1.232	-0.0207
10	0.0139	1.2323	-0.0226
11	0.0168	1.2312	-0.0244
12	0.0196	1.2293	-0.0262
13	0.0225	1.2271	-0.028
14	0.0253	1.2246	-0.0298
15	0.0283	1.2235	-0.0316
16	0.0311	1.2216	-0.0334
17	0.0337	1.2189	-0.0352
18	0.0361	1.2156	-0.037
19	0.0384	1.2118	-0.0388
20	0.0407	1.2076	-0.0406
21	0.0429	1.2032	-0.0423
22	0.0452	1.1987	-0.0441
23	0.0476	1.1943	-0.0458
24	0.0501	1.1902	-0.075

MACH = 1.000
XCG/D = -.230
ZCG/D = -0.

ALPHA	CN	CA	CSM
0	0	1.3	0
1	-0.0022	1.3025	-0.0031
2	-0.0059	1.3104	-0.0069
3	-0.0055	1.3154	-0.0093
4	-0.0047	1.3225	-0.0116
5	-0.0032	1.3275	-0.0137
6	-0.0009	1.3306	-0.0155
7	0.0022	1.3323	-0.0173
8	0.0057	1.3329	-0.019
9	0.0089	1.3325	-0.0206
10	0.012	1.3322	-0.0222
11	0.0149	1.3336	-0.0238
12	0.0178	1.3359	-0.0254
13	0.0207	1.3389	-0.027
14	0.0236	1.3419	-0.0286
15	0.0265	1.3461	-0.0303
16	0.0292	1.348	-0.0319
17	0.0318	1.3483	-0.0336
18	0.0343	0.3472	-0.0352
19	0.0367	1.3452	-0.0368
20	0.039	1.3426	-0.0358
21	0.0413	1.3398	-0.0401
22	0.0436	1.3371	-0.0417
23	0.0459	1.335	-0.0432
24	0.0483	1.3338	-0.0448

MACH = 1.2
XCG/D = -.23
ZCG/D = -0.

ALPHA	CN	CA	CSM
0	0	1.3153	0
1	-0.0087	1.322	-0.0048
2	-0.0102	1.3246	-0.0073
3	-0.0084	1.3276	-0.009
4	-0.0053	1.3298	-0.0105
5	-0.002	1.3313	-0.0117
6	0.0014	1.3327	-0.0129
7	0.0047	1.335	-0.0141
8	0.0078	1.3375	-0.0154
9	0.0106	1.3399	-0.0167
10	0.0133	1.342	-0.0181
11	0.0158	1.3437	-0.0196
12	0.0183	1.3452	-0.0211
13	0.0207	1.3473	-0.0226
14	0.0231	1.3493	-0.024
15	0.0252	1.3505	-0.0255
16	0.0274	1.3516	-0.0269
17	0.0295	1.3525	-0.0284
18	0.0316	1.3532	-0.0299
19	0.0338	1.354	-0.0314
20	0.0358	1.355	-0.0329
21	0.0378	1.3563	-0.0343
22	0.0397	1.3581	-0.0358
23	0.0415	1.3605	-0.0372
24	0.0432	1.3637	-0.0386